



SEQUENCE LISTING

<110> Trimeris, Inc.
Dwyer, John
Delmedico, Mary

<120> Method for production of antivirals by use of
HIV-derived HR1 peptides, and trimers formed therefrom

<130> TRM-002 (7872-122-999)

<140> 10/671,316
<141> 2003-09-24

<150> 60/414,515
<151> 2002-09-27

<160> 84

<170> PatentIn version 3.2

<210> 1
<211> 59
<212> PRT
<213> Human immunodeficiency virus

<400> 1
Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
1 5 10 15
Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30
Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val
35 40 45
Glu Arg Tyr Leu Lys Asp Gln Leu Leu Gly Ile
50 55

<210> 2
<211> 38
<212> PRT
<213> Human immunodeficiency virus

<400> 2
Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
1 5 10 15
Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu
20 25 30
Arg Tyr Leu Lys Asp Gln
35

<210> 3
<211> 43
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 3
Gly Ser Thr Met Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg
1 5 10 15
Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala

Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr
 35 40 30

<210> 4
 <211> 54
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 4
 Gly Ser Thr Met Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg
 1 5 10 15
 Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala
 20 25 30
 Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys
 35 40 45
 Gln Leu Gln Ala Arg Ile
 50

<210> 5
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 5
 Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
 1 5 10 15
 Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
 20 25 30
 Gln His Leu Leu
 35

<210> 6
 <211> 38
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 6
 Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
 1 5 10 15
 Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
 20 25 30
 Gln His Leu Leu Gln Leu
 35

<210> 7
 <211> 40
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 7
 Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
 1 5 10 15
 Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
 20 25 30
 Gln His Leu Leu Gln Leu Thr Val
 35 40

<210> 8
 <211> 50
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 8
 Gly Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser
 1 5 10 15
 Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln
 20 25 30
 Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala
 35 40 45
 Arg Ile
 50

<210> 9
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 9
 Ala Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly
 1 5 10 15
 Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln
 20 25 30
 His Leu Leu Gln
 35

<210> 10
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 10
 Arg Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile
 1 5 10 15
 Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His
 20 25 30
 Leu Leu Gln Leu
 35

<210> 11
 <211> 36

<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 11
Ser Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val
1 5 10 15
Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
20 25 30
Leu Gln Leu Thr
35

<210> 12
<211> 35
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 12
Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln
1 5 10 15
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
20 25 30
Gln Leu Thr
35

<210> 13
<211> 36
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 13
Met Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln
1 5 10 15
Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
20 25 30
Gln Leu Thr Val
35

<210> 14
<211> 34
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 14
Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
1 5 10 15
Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
20 25 30
Leu Thr

<210> 15
 <211> 35
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 15
 Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
 1 5 10 15
 Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
 20 25 30
 Leu Thr Val
 35

<210> 16
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 16
 Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
 1 5 10 15
 Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
 20 25 30
 Leu Thr Val Trp
 35

<210> 17
 <211> 37
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 17
 Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
 1 5 10 15
 Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
 20 25 30
 Leu Thr Val Trp Gly
 35

<210> 18
 <211> 38
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 18
 Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
 1 5 10 15
 Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln

20 25 30
 Leu Thr Val Trp Gly Ile
 35

 <210> 19
 <211> 44
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 19
 Thr Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln
 1 5 10 15
 Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln
 20 25 30
 Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg
 35 40

 <210> 20
 <211> 36
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 20
 Leu Thr Val Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln
 1 5 10 15
 Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu
 20 25 30
 Thr Val Trp Gly
 35

 <210> 21
 <211> 42
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 21
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
 35 40

 <210> 22
 <211> 47
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 22

Gln	Ala	Arg	Gln	Leu	Leu	Ser	Gly	Ile	Val	Gln	Gln	Gln	Asn	Asn	Leu
1				5					10					15	
Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu	Gln	Leu	Thr	Val	Trp
			20					25					30		
Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Ile	Leu	Ala	Val	Glu	Arg	Tyr	
		35					40					45			

<210> 23
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 23

Gln	Ala	Arg	Gln	Leu	Leu	Ser	Gly	Ile	Val	Gln	Gln	Gln	Asn	Asn	Leu
1				5					10					15	
Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu	Gln	Leu	Thr	Val	Trp
			20					25					30		
Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Ile	Leu	Ala	Val	Glu	Arg	Tyr	Leu
		35					40					45			

Lys

<210> 24
 <211> 51
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 24

Gln	Ala	Arg	Gln	Leu	Leu	Ser	Gly	Ile	Val	Gln	Gln	Gln	Asn	Asn	Leu
1				5					10					15	
Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu	Gln	Leu	Thr	Val	Trp
			20					25					30		
Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Ile	Leu	Ala	Val	Glu	Arg	Tyr	Leu
		35					40					45			

Lys Asp Gln

50

<210> 25
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 25

Ser	Gly	Ile	Val	Gln	Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala
1				5					10					15	
Gln	Gln	His	Leu	Leu	Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln
			20					25					30		
Ala	Arg	Ile	Leu												
			35												

<210> 26

<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 26
Ser Gly Ile Val Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala
1 5 10 15
Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln
20 25 30
Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40 45

<210> 27
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 27
Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
1 5 10 15
Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30
Ala Val Glu Arg Tyr Leu Lys Asp Gln
35 40

<210> 28
<211> 34
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 28
Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Trp Gly
1 5 10 15
Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu Lys
20 25 30
Asp Gln

<210> 29
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 29
Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
1 5 10 15
Leu Gln Leu Thr Ala Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
20 25 30
Ala Val Glu Arg Tyr Leu Lys Asp Gln

35 40

<210> 30
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 30
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
 1 5 10 15
 Leu Gln Leu Thr Val Ala Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 31
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 31
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Leu Thr Val Phe
 20 25 30
 Gly Ile Arg Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys

<210> 32
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 32
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys

<210> 33
 <211> 36
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 33
 Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu Ile His
 1 5 10 15
 Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu Gln Glu
 20 25 30
 Leu Leu Glu Leu
 35

<210> 34
 <211> 51
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 34
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys Asp Gln
 50

<210> 35
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 35
 Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
 1 5 10 15
 Leu Arg Ala Leu Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
 20 25 30
 Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
 35 40 45

Lys

<210> 36
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 36
 Gln Ile Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Ile Gln His Ala Leu Gln Ala Ile Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45

Lys

<210> 37
<211> 49
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 37
Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
1 5 10 15
Leu Arg Ala Leu Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
20 25 30
Gly Val Arg Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys

<210> 38
<211> 51
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 38
Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
1 5 10 15
Leu Arg Ala Ile Glu Ala Thr Gln His Ala Val Gln Ala Leu Val Trp
20 25 30
Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys Asp Gln
50

<210> 39
<211> 51
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 39
Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
1 5 10 15
Leu Arg Ala Leu Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
20 25 30
Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
35 40 45

Lys Asp Gln
50

<210> 40
<211> 51
<212> PRT
<213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 40
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Ala Leu Gln Ala Thr Val Trp
 20 25 30
 Gly Val Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys Asp Gln
 50

<210> 41
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 41
 Gln Ala Arg Gln Leu Val Ser Gly Leu Val Gln Gln Gln Asn Asn Ile
 1 5 10 15
 Leu Arg Ala Leu Glu Ala Thr Gln His Leu Val Gln Leu Leu Val Trp
 20 25 30
 Gly Val Lys Gln Leu Gln Ala Arg Val Leu Ala Leu Glu Arg Tyr Ile
 35 40 45
 Lys

<210> 42
 <211> 49
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 42
 Gln Ile Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Ile Gln His Leu Leu Gln Leu Ile Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys

<210> 43
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 43
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
 1 5 10 15

Leu Gln Leu Thr Val Phe Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 44
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 44
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
 1 5 10 15
 Leu Gln Leu Thr Val Trp Gly Ile Ala Gln Leu Gln Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 45
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 45
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
 1 5 10 15
 Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Ala Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 46
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 46
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Ala
 1 5 10 15
 Leu Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 47
 <211> 51
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 47
 Gln Ala Arg Gln Leu Leu Ser Gly Ile Val Gln Gln Gln Asn Asn Leu
 1 5 10 15
 Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu Gln Ala Thr Val Trp
 20 25 30
 Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala Val Glu Arg Tyr Leu
 35 40 45
 Lys Asp Gln
 50

<210> 48
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 48
 Gln Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu
 1 5 10 15
 Leu Gln Ala Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu
 20 25 30
 Ala Val Glu Arg Tyr Leu Lys Asp Gln
 35 40

<210> 49
 <211> 37
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 49
 Met Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu
 1 5 10 15
 Ile Ser His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn
 20 25 30
 Glu Gln Glu Leu Leu
 35

<210> 50
 <211> 64
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 50
 Trp Asn Ala Ser Trp Ser Asn Lys Ser Leu Glu Gln Ile Trp Asn Asn
 1 5 10 15
 Met Thr Trp Met Glu Trp Asp Arg Glu Ile Asn Asn Tyr Thr Ser Leu
 20 25 30
 Ile His Ser Leu Ile Glu Glu Ser Gln Asn Gln Gln Glu Lys Asn Glu
 35 40 45
 Gln Glu Leu Leu Glu Leu Asp Lys Trp Ala Ser Leu Trp Asn Trp Phe
 50 55 60

<210> 51

<211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 51
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

 <210> 52
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 52
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

 <210> 53
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 53
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

 <210> 54
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 54
 Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Lys Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Leu Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Arg Asp Gln Gln

35

40

<210> 55

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 55

Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala
			20					25					30		
Val	Glu	Arg	Tyr	Leu	Lys	Asp	Gln	Gln							
			35				40								

<210> 56

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 56

Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Met	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Thr	Arg	Val	Leu	Ala
			20					25					30		
Ile	Glu	Arg	Tyr	Leu	Gln	Asp	Gln	Gln							
			35				40								

<210> 57

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 57

Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Ile	Leu	Ala
			20					25					30		
Val	Glu	Arg	Tyr	Leu	Arg	Asp	Gln	Gln							
			35				40								

<210> 58

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 58

Gln	Gln	Ser	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu
1				5					10					15	

Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Lys
 35 40

<210> 59
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 59
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Gln Asp Gln Gln
 35 40

<210> 60
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 60
 Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Leu Glu Arg Tyr Leu Arg Asp Gln Gln
 35 40

<210> 61
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 61
 Gln Gln Asn Asn Leu Leu Met Ala Ile Glu Ala Gln Gln His Met Leu
 1 5 10 15
 Glu Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 62
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 62
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Lys Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 63
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 63
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Asp Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 64
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 64
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Lys Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 65
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 65
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Gly Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 66
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

 <400> 66
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Ser Tyr Leu Lys Asp Gln Gln
 35 40

 <210> 67
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 67
 Gln Gln Thr Asn Met Leu Lys Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

 <210> 68
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 68
 Gln Gln Thr Ser Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Arg Asp Gln Gln
 35 40

 <210> 69
 <211> 41
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> synthesized peptide

 <400> 69
 Gln Gln Asn Asp Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Leu Glu Gly Tyr Leu Gln Asp Gln Gln
 35 40

 <210> 70
 <211> 41

<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 70
Gln Gln Asn Asn Met Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Arg Asp Gln Gln
35 40

<210> 71
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 71
Gln Gln Ser Asn Leu Met Arg Ala Ile Glu Ala Leu Gln His Met Val
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 72
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<400> 72
Gln Gln Ser Asn Leu Met Arg Ala Ile Glu Ala Gln Gln His Met Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 73
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> synthesized peptide

<220>
<221> VARIANT
<222> 3
<223> Xaa = Any Amino Acid

<400> 73
Gln Gln Xaa Asn Leu Leu Arg Ala Met Glu Ala Gln Gln His Leu Leu

1	5	10	15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala			
	20	25	30
Leu Glu Arg Tyr Leu Arg Asp Gln Gln			
	35	40	

<210> 74
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 74
Gln Gln Asn Asp Leu Leu Arg Gly Ile Asp Ala Pro Gln His Leu Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Trp Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Arg Gly Gln Gln
35 40

<210> 75
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 75
Gln Gln Asn Ser Leu Leu Gln Ala Ile Glu Ala Gln Gln Arg Met Leu
1 5 10 15
Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Val Glu Arg Tyr Leu Lys Asp Gln Gln
35 40

<210> 76
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 76
Gln Gln Asn Asp Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
1 5 10 15
Arg Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
20 25 30
Leu Glu Arg Tyr Leu Arg Asp Gln Gln
35 40

<210> 77
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 77
 Gln Gln Thr Asn Met Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Ser Ile Lys Gln Leu Gln Ala Arg Val Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 78
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 78
 Gln Arg Ser Asn Leu Leu Lys Ala Ile Glu Ala Gln Gln Gln Met Trp
 1 5 10 15
 Arg Leu Thr Val Trp Gly Phe Lys Gln Leu Gln Ala Arg Leu Leu Ala
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 79
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 79
 Gln Gln Asn Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Met Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Arg Ala Arg Val Leu Ala
 20 25 30
 Ile Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 80
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> synthesized peptide

<400> 80
 Gln Gln Ser Asn Leu Leu Arg Ala Ile Glu Ala Gln Gln His Leu Leu
 1 5 10 15
 Gln Leu Thr Val Trp Gly Ile Lys Gln Leu Gln Ala Arg Ile Pro Gly
 20 25 30
 Val Glu Arg Tyr Leu Lys Asp Gln Gln
 35 40

<210> 81
 <211> 41
 <212> PRT
 <213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 81

Gln	Gln	Asn	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala
			20					25					30		
Val	Lys	Arg	Tyr	Leu	Arg	Asp	Gln	Gln							
		35					40								

<210> 82

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 82

Glu	Arg	Asn	Lys	Leu	Arg	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Met	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala
			20					25					30		
Val	Glu	Arg	Ser	Leu	Lys	Asp	Gln	Gln							
		35					40								

<210> 83

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 83

His	Gln	Ser	Asn	Leu	Leu	Arg	Ala	Ile	Glu	Ala	Gln	Gln	His	Leu	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Ile	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala
			20					25					30		
Val	Glu	Arg	Tyr	Leu	Arg	Asp	Gln	Gln							
		35					40								

<210> 84

<211> 41

<212> PRT

<213> Artificial Sequence

<220>

<223> synthesized peptide

<400> 84

Gln	Gln	Asn	Asp	Leu	Leu	Arg	Gly	Ile	Asp	Ala	Pro	Gln	His	Leu	Leu
1				5					10					15	
Gln	Leu	Thr	Val	Trp	Gly	Val	Lys	Gln	Leu	Gln	Ala	Arg	Val	Leu	Ala
			20					25					30		
Val	Glu	Arg	Tyr	Leu	Arg	Gly	Gln	Gln							
		35					40								